

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-392-9
Relating to Exemptions Under Section 27156
of the Vehicle Code

ADVANCED ENGINE MANAGEMENT, INC.
TRU-POWER ALTERNATOR PULLEY
PART NO. 23-7400

Pursuant to the authority vested in the Air Resources Board (ARB) by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-9;

IT IS ORDERED AND RESOLVED: That installation of the Tru-Power Alternator Pulley, manufactured by Advanced Engine Management, Inc. (AEM) of 2205 126th Street, Unit A, Hawthorne, California 90250, has been found not to reduce the effectiveness of the applicable vehicle pollution control system, and therefore, the Tru-Power Alternator Pulley, part no. 23-7400, is exempt from the prohibitions of Section 27156 of the Vehicle Code for installation on 2000 model-year 2.0 liter Ford Motor Company Focus ZX3.

The Tru-Power Alternator Pulley kit includes a 2.587-inch diameter alternator pulley (part no. 2-6010) and a serpentine belt (part no. 6PK2145). The Tru-Power Alternator Pulley replaces the original equipment manufacturer 1.895-inch diameter alternator pulley.

This exemption is based on examination of the On-Board Diagnostic II (OBD II) system of a 2000 model-year 2.0 liter Ford Focus ZX3 with AEM's Tru-Power Alternator Pulley and engineering evaluation of the emission impact of the alternator pulley on the vehicle. Based on evaluation of the design and operating principles of the Tru-Power Alternator Pulley, it is concluded that the Tru-Power Alternator Pulley will not affect the operation of the vehicle's OBD II system and will not adversely affect its exhaust emissions.

This Executive Order is valid provided that installation instructions for the Tru-Power Alternator Pulley do not recommend tuning the vehicle to specifications different from those of the vehicle manufacturer.

Changes made to the design or operating conditions of the Tru-Power Alternator Pulley, as exempt by the ARB, which adversely affect the performance of the vehicle's pollution control system, shall invalidate this Executive Order.

Marketing of the Tru-Power Alternator Pulley using identification other than that shown in this Executive Order or for an application other than that listed in this Executive Order shall be prohibited unless prior approval is obtained from the ARB.

Exemption of the Tru-Power Alternator Pulley shall not be construed as exemption to sell, offer for sale, or advertise any component of the kit as an individual device.

This Executive Order shall not apply to any Tru-Power Alternator Pulley advertised, offered for sale, sold with, or installed on a motor vehicle prior to or concurrent with transfer to an ultimate purchaser.

This Executive Order does not constitute any opinion as to the effect the use of the Tru-Power Alternator Pulley may have on any warranty either expressed or implied by the vehicle manufacturer.

No claim of any kind, such as "Approved by the Air Resources Board," may be made with respect to the action taken herein in any advertising or other oral or written communication.

In addition to the foregoing, the ARB reserves the right in the future to review this Executive Order and the exemption provided herein to assure that the exempted add-on or modified part continues to meet the standards and procedures of California Code of Regulations, Title 13, Section 2222, et seq.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF ANY CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF ADVANCED ENGINE MANAGEMENT, INC.'S TRU-POWER ALTERNATOR PULLEY.

Violation of any of the above conditions shall be grounds for revocation of this Executive Order. The Executive Order may be revoked only after a ten-day written notice of intention to revoke the Executive Order, in which period the holder of the Executive Order may request in writing a hearing to contest the proposed revocation. If a hearing is requested, it shall be held within ten days of receipt of the request, and the Executive Order may not be revoked until a determination after the hearing that grounds for revocation exist.

Executed at El Monte, California, this 18th day of May 2000.



R. B. Summerfield, Chief
Mobile Source Operations Division

State of California
AIR RESOURCES BOARD

EVALUATION OF ADVANCED ENGINE MANAGEMENT, INC.'S
TRU-POWER ALTERNATOR PULLEY, PART NO. 23-7400
FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE
SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13 OF THE
CALIFORNIA CODE OF REGULATIONS

May 2000

by

Mobile Source Operations Division
Aftermarket Parts Section
9528 Telstar Avenue
El Monte, CA 91731-2990

(This report has been reviewed and approved for publication by the staff of the California Air Resources Board. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.)

SUMMARY

Advanced Engine Management, Inc. (AEM) of 2205 126th Street, Unit A, Hawthorne, California 90250 has applied for an exemption from the prohibitions of Section 27156 of the California Vehicle Code for their Tru-Power Alternator Pulley. The Tru-Power Alternator Pulley is designed to replace the original equipment manufacturer alternator pulley on a 2000 model-year 2.0 liter Ford Motor Company Focus ZX3.

Based on engineering evaluation and the test data submitted by AEM, the staff concludes that installation of the Tru-Power Alternator Pulley will not adversely affect the exhaust emissions or the on-board diagnostic system of the vehicles for which the exemption is requested. This vehicle application includes those vehicles that have been certified to Low-Emission Vehicle exhaust emission standards.

Staff recommends that AEM be granted an exemption for their Tru-Power Alternator Pulley as requested and that Executive Order No. D-392-9 be issued.

CONTENTS

	Page Number
SUMMARY	i
CONTENTS	ii
I. INTRODUCTION	1
II. CONCLUSION	1
III. RECOMMENDATION	2
IV. DEVICE DESCRIPTION AND OPERATION	2
V. DEVICE EVALUATION AND DISCUSSION	2

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EVALUATION OF ADVANCED ENGINE MANAGEMENT, INC.'S
TRU-POWER ALTERNATOR PULLEY, PART NO. 23-7400
FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE
SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13 OF THE
CALIFORNIA CODE OF REGULATIONS

I. INTRODUCTION

Advanced Engine Management, Inc. (AEM) of 2205 126th Street, Unit A, Hawthorne, California 90250 has applied for an exemption from the prohibitions of Section 27156 of the California Vehicle Code for their Tru-Power Alternator Pulley for installation on a 2000 model-year 2.0 liter Ford Motor Company (Ford) Focus ZX3. The primary purpose of the Tru-Power Alternator Pulley is to increase engine power output by reducing the amount of torque required from the crankshaft to drive the alternator and pulley.

The vehicle model for which AEM is requesting exemption is certified to meet the Low-Emission Vehicle exhaust emission standards and is equipped with On-Board Diagnostic II (OBD II) system. AEM has submitted all the required information including installation instructions, device identification label, and alternator voltage comparison data for evaluation.

II. CONCLUSION

Based on engineering evaluation and the test data submitted by AEM, the staff concludes that the Tru-Power Alternator Pulley will not adversely affect the exhaust emissions or the OBD II system of the 2000 model-year 2.0 liter Ford Focus ZX3.

III. RECOMMENDATION

The staff recommends that AEM be granted an exemption as requested, permitting advertisement, sale, and use of their Tru-Power Alternator Pulley, part no. 23-7400, on 2000 model-year 2.0 liter Ford Focus ZX3.

IV. DEVICE DESCRIPTION AND OPERATION

AEM's Tru-Power Alternator Pulley is designed to replace the original equipment manufacturer (OEM) alternator pulley. It is lighter in weight and larger in diameter than the OEM alternator pulley. These changes allow the pulley to spin more easily and slowly, reducing the amount of torque needed from the crankshaft. AEM claims that this results in increased engine power output. The Tru-Power Alternator Pulley (P/N 2-6010) is made of aluminum and measures 2.587 inches in outer diameter (top of ribs). It replaces the steel OEM pulley which measures 1.895 inches in outer diameter. Both pulleys have six ribs for enhanced grip. Along with the alternator pulley, the kit includes a replacement serpentine belt (P/N 6PK2145), 2145 mm in length. The serpentine belt also drives the power steering, air conditioning compressor, and the water pump. The installation of the Tru-Power Alternator Pulley does not remove or alter any of the emission control system components.

V. DEVICE EVALUATION AND DISCUSSION

Based on evaluation of the design and operating principles of the Tru-Power Alternator Pulley, the staff concludes that its installation will not have any significant adverse impact on the exhaust emissions of the applicable vehicles. However, since the alternator pulley spins more slowly, less mechanical energy is converted into

electrical energy to charge the battery. Under certain operating conditions, this potentially could result in an insufficiently charged battery whose voltage falls below the threshold required for operation of some of the OBD II system monitoring components. To demonstrate that the alternator pulley would not interfere with the vehicle's OBD II system, AEM compared the alternator voltage output with the OEM pulley and the Tru-Power Alternator Pulley. The vehicle used for this testing was a 2000 model-year 2.0 liter Ford Focus ZX3 with engine family code YFMXV02.0VF3 (TWC, HO₂S (2), EGR, and SFI; odometer 995 miles).

A digital voltage meter was connected to the battery terminal, and the voltage output was measured at idle with all of the accessories turned off. Then the measurements were repeated with all of the accessories turned on for comparison. The accessories included (1) front lights: headlights, high/low beam, and turn signals; (2) rear lights: stop lights, reverse lights, and turn signals; (3) exterior accessories: windshield wiper and washer, rear wiper and washer, and horn; and (4) interior accessories: AM/FM/CD player, cigarette lighter, dome light, and air conditioning/heater fan. Table below shows the results:

Pulley	Alternator Voltage Output Accessories Off	Alternator Voltage Output Accessories On
OEM	14.3 (13.4)	13.4 (13.4)
Tru-Power	12.4 (13.4)	12.1 (13.4)

- Note: (1) Measurements were made with the engine at normal operating temperature and normal idle speed of 750 rpm.
(2) The voltage outputs in parentheses were measured at high idle speed of 1,000 rpm.

Compared to the OEM pulley, the Tru-Power Alternator Pulley caused a 10 percent decrease in voltage output with all of the accessories operating; however, under this worst case condition, the voltage output remained above 12 volts.

In addition to the voltage measurements, AEM brought in the test vehicle for an OBD II system check at the ARB facility. The following summarizes the findings of the OBD II check:

1. As received, the on-board computer showed that all of the readiness indicators (misfire, fuel system, comprehensive component, oxygen sensor, and oxygen sensor heater) had set to complete with the exception of the catalyst, evaporative system, and the exhaust gas recirculation system monitors. The incomplete readiness indicator statuses of the three monitors were attributed to a battery disconnect performed by AEM on the previous day. No DTC's were stored in the on-board computer.
2. The staff reset the readiness indicators then drove the vehicle on-road (a combination of city and highway driving) for approximately 30 minutes. Following the drive, all of the readiness indicators had set to complete with the exception of the same three monitors noted above. No DTC's were stored in the on-board computer. Since the OBD II system check was inconclusive at this point, the staff requested the AEM representative to bring the vehicle back in approximately one week for a re-check.
3. After one week and approximately 700 accumulated miles (odometer 1,716 miles), the on-board computer showed that all of the readiness indicators had set to complete with the exception of the evaporative system monitor. No DTC's were stored in the on-board computer.

The staff has determined based on Ford's OBD II system information that installation of the Tru-Power Alternator Pulley would not affect any of the OBD II components used in the evaporative system monitor. Therefore, the staff concludes that the Tru-Power Alternator Pulley is not the cause for the incomplete readiness indicator status of the evaporative system monitor.

Based on the findings above, the staff concludes that the Tru-Power Alternator Pulley does not affect the operation of the vehicle's OBD II system.